

Appl. No. 09/297,483
Amendment Dated December 9, 2003
Reply to Office Action of September 16, 2003

Attorney Docket No. 81756.0003
Customer No.: 26021

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.-36. (Cancelled)

37. (Currently Amended) A method for manufacturing an organic EL element having a stacked structure including a hole injecting or transporting layer and a light-emitting layer formed within a partitioning member which is divided into individual pixel areas, the method comprising:

forming an a plurality of anode layer layers

forming the partitioning member above over a substrate, the partitioning member lying at least between adjacent ones of the plurality of anode layers so as to independently partition the adjacent ones of the plurality of anode layers, whereby a plurality of openings are formed over at least a portion of an anode layer, having openings over at least a portion of the anode layer, the openings corresponding to the pixel areas;

forming a hole injecting or transporting layer by independently filling each of the openings with a composition for the hole injecting or transporting layer using an ink-jet head, the composition comprising (1) a conductive material containing at least a lubricant, polyethylene dioxythiophene, and polystyrene sulfonic acid, and (2) a solvent;

drying the composition filled in the openings to form the hole injecting or transporting layer; and

independently filling each of the openings with a light-emitting layer composition over the hole injecting or transporting layer using an ink-jet head to form the light-emitting layer, wherein a height of the hole injecting or transporting layer and the light-emitting layer is less than that of the partitioning member;

forming a cathode layer over the light-emitting layer.

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38. (Previously Presented) The method for manufacturing of claim 37, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, and wherein a contact angle between the composition and a material making up an ink discharge nozzle face of the ink-jet head is within the range of 30° to 170°.

39. (Previously Presented) The method for manufacturing of claim 37, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, and wherein the composition has a viscosity of 1 to 20 cps.

40. (Previously Presented) The manufacturing of claim 37, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, and wherein the composition has a surface tension of 20 to 70 dyne/cm.

41. (Previously Presented) The manufacturing of claim 37, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, wherein the composition has a viscosity of 1 to 20 cps, and wherein a contact angle between the composition and a material making up an ink discharge nozzle face of the ink-jet head is within the range of 30° to 170°.

42. (Previously Presented) The manufacturing of claim 37, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, and wherein the composition has a viscosity of 1 to 20 cps and a surface tension of 20 to 70 dyne/cm.

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43. (Previously Presented) The manufacturing of claim 37, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, wherein the composition has a surface tension of 20 to 70 dyne/cm, and wherein a contact angle between the composition and a material making up an ink discharge nozzle face of the ink-jet head is within the range of 30° to 170°.

44. (Previously Presented) The manufacturing of claim 37, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, wherein the composition has a viscosity of 1 to 20 cps and a surface tension of 20 to 70 dyne/cm, and wherein a contact angle between the composition and a material making up an ink discharge nozzle face of the ink-jet head is within the range of 30° to 170°.

45. (Previously Presented) The method for manufacturing of claim 37, wherein the conductive material is present in a dissolved or dispersed state in the solvent and the solvent is a polar solvent.

46. (Previously Presented) The method for manufacturing of claim 45, wherein the polar solvent is a mixed solvent of water and a lower alcohol.

47. (Previously Presented) The method for manufacturing of claim 46, wherein the lower alcohol is methanol or ethanol.

48. (Previously Presented) The method for manufacturing of claim 45, wherein the polar solvent is a mixed solvent of water and at least one solvent selected from the group consisting of mono and dialkyl ethers of ethylene glycol.

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49. (Previously Presented) The method for manufacturing of claim 48, wherein the at least one solvent selected from the group is ethoxy ethanol.

50. (Cancelled)

51. (Previously Presented) The manufacturing process of claim 37, wherein the lubricant is glycerin.

52. (Cancelled)

53. (Previously Presented) The method for manufacturing of claim 37, wherein a film thickness of the hole injecting or transporting layer is 0.1 μm or less.

54. (Previously Presented) The method for manufacturing of claim 53, wherein a film resistance of the hole injecting or transporting layer is in the range $0.5 \times 10^9 \Omega/\text{m}^2$ to $5 \times 10^9 \Omega/\text{m}^2$.

55. - 61. (Cancelled)

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62. (Currently Amended) A method for manufacturing an electroluminescent display, the method comprising:

(1) manufacturing a stacked EL element having a stacked structure including a hole injecting or transporting layer and a light-emitting layer formed within a partitioning member which is divided into individual pixel areas, wherein the step of manufacturing the stacked EL element comprises:

~~forming an a plurality of anode layer layers~~

~~forming the partitioning member above over a substrate, the partitioning member lying at least between adjacent ones of the plurality of anode layers so as to independently partition the adjacent ones of the plurality of anode layers, whereby a plurality of openings are formed over at least a portion of an anode layer, having openings over at least a portion of the anode layer, the openings corresponding to the pixel areas;~~

~~forming a hole injecting or transporting layer by independently filling each of the openings with a composition for the hole injecting or transporting layer using an ink-jet head, the composition comprising (a) a conductive material containing at least a lubricant, polyethylene dioxythiophene, and polystyrene sulfonic acid, and (b) a solvent;~~

~~drying the composition filled in the openings to form the hole injecting or transporting layer; and~~

~~independently filling each of the openings with a light-emitting layer composition over the hole injecting or transporting layer using an ink-jet head to form the light-emitting layer, wherein a height of the hole injecting or transporting layer and the light-emitting layer is less than that of the partitioning member;~~

~~forming a cathode layer over the light-emitting layer; and~~

(2) incorporating the stacked EL element into the electroluminescent display.

63. (Cancelled)

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64. (Previously Presented) A method for manufacturing of claim 37, wherein the lubricant is diethylene glycol.

65. (Cancelled)

66. (Previously Presented) A method for manufacturing of claim 62, wherein the lubricant is diethylene glycol.

67-82. (Cancelled)

83. (Previously Presented) The method for manufacturing of claim 62, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, and wherein a contact angle between the composition and a material making up an ink discharge nozzle face of the ink-jet head is within the range of 30° to 170°.

84. (Previously Presented) The method for manufacturing of claim 62, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, and wherein the composition has a viscosity of 1 to 20 cps.

85. (Previously Presented) The method for manufacturing of claim 62, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, and wherein the composition has a surface tension of 20 to 70 dyne/cm.

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86. (Previously Presented) The method for manufacturing of claim 62, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, wherein the composition has a viscosity of 1 to 20 cps, and wherein a contact angle between the composition and a material making up an ink discharge nozzle face of the ink-jet head is within the range of 30° to 170°.

87. (Previously Presented) The method for manufacturing of claim 62, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, and wherein the composition has a viscosity of 1 to 20 cps and a surface tension of 20 to 70 dyne/cm.

88. (Previously Presented) The method for manufacturing of claim 62, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, wherein the composition has a surface tension of 20 to 70 dyne/cm, and wherein a contact angle between the composition and a material making up an ink discharge nozzle face of the ink-jet head is within the range of 30° to 170°.

89. (Previously Presented) The method for manufacturing of claim 62, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, wherein the composition has a viscosity of 1 to 20 cps and a surface tension of 20 to 70 dyne/cm, and wherein a contact angle between the composition and a material making up an ink discharge nozzle face of the ink-jet head is within the range of 30° to 170°.

90. (Previously Presented) The method for manufacturing of claim 62, wherein the conductive material is present in a dissolved or dispersed state in the solvent and the solvent is a polar solvent.

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91. (Previously Presented) The method for manufacturing of claim 90, wherein the polar solvent is a mixed solvent of water and a lower alcohol.

92. (Previously Presented) The method for manufacturing of claim 91, wherein the lower alcohol is methanol or ethanol.

93. (Previously Presented) The method for manufacturing of claim 90, wherein the polar solvent is a mixed solvent of water and at least one solvent selected from the group consisting of mono and dialkyl ethers of ethylene glycol.

94. (Previously Presented) The method for manufacturing of claim 93, wherein the at least one solvent selected from the group is ethoxy ethanol.

95. (Previously Presented) The method for manufacturing of claim 62, wherein the lubricant is glycerin.

96. (Previously Presented) The method for manufacturing of claim 62, wherein a film thickness of the hole injecting or transporting layer is 0.1 μ m or less.

97. (Previously Presented) The method for manufacturing of claim 62, wherein a film resistance of the hole injecting or transporting layer is in the range $0.5 \times 10^9 \Omega/\text{m}^2$ to $5 \times 10^9 \Omega/\text{m}^2$.

98.-112. (Cancelled)

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113. (Currently Amended) An organic EL element, having a stacked structure including a hole injecting or transporting layer and a light-emitting layer formed within a partitioning member which is divided into individual pixel areas, manufactured by a manufacturing process, comprising:

forming ~~an~~ a plurality of anode layer layers

forming the partitioning member above over a substrate, the partitioning member lying at least between adjacent ones of the plurality of anode layers so as to independently partition the adjacent ones of the plurality of anode layers, whereby a plurality of openings are formed over at least a portion of an anode layer, having openings over at least a portion of the anode layer, the openings corresponding to the pixel areas;

forming a hole injecting or transporting layer by independently filling each of the openings with a composition for the hole injecting or transporting layer using an ink-jet head, the composition comprising (1) a conductive material containing at least a lubricant, polyethylene dioxothiophene, and polystyrene sulfonic acid, and (2) a solvent;

drying the composition filled in the openings to form the hole injecting or transporting layer; and

independently filling each of the openings with a light-emitting layer composition over the hole injecting or transporting layer using an ink-jet head to form the light-emitting layer, wherein a height of the hole injecting or transporting layer and the light-emitting layer is less than that of the partitioning member;

forming a cathode layer over the light-emitting layer.

114. (Previously Presented) The organic EL element of claim 113, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, and wherein a contact angle between the composition and a material making up an ink discharge nozzle face of the ink-jet head is within the range of 30° to 170°.

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115. (Previously Presented) The organic EL element of claim 113, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, and wherein the composition has a viscosity of 1 to 20 cps.

116. (Previously Presented) The organic EL element of claim 113, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, and wherein the composition has a surface tension of 20 to 70 dyne/cm.

117. (Previously Presented) The organic EL element of claim 113, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, wherein the composition has a viscosity of 1 to 20 cps, and wherein a contact angle between the composition and a material making up an ink discharge nozzle face of the ink-jet head is within the range of 30° to 170°.

118. (Previously Presented) The organic EL element of claim 113, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, and wherein the composition has a viscosity of 1 to 20 cps and a surface tension of 20 to 70 dyne/cm.

119. (Previously Presented) The organic EL element of claim 113, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, wherein the composition has a surface tension of 20 to 70 dyne/cm, and wherein a contact angle between the composition and a material making up an ink discharge nozzle face of the ink-jet head is within the range of 30° to 170°.

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120. (Previously Presented) The organic EL element of claim 113, wherein the conductive material is contained in an amount of 0.01 wt% to 10 wt% of the composition, wherein the composition has a viscosity of 1 to 20 cps and a surface tension of 20 to 70 dyne/cm, and wherein a contact angle between the composition and a material making up an ink discharge nozzle face of the ink-jet head is within the range of 30° to 170°.

121. (Previously Presented) The organic EL element of claim 113, wherein the conductive material is present in a dissolved or dispersed state in the solvent and the solvent is a polar solvent.

122. (Previously Presented) The organic EL element of claim 121, wherein the polar solvent is a mixed solvent of water and a lower alcohol.

123. (Previously Presented) The organic EL element of claim 122, wherein the lower alcohol is methanol or ethanol.

124. (Previously Presented) The organic EL element of claim 121, wherein the polar solvent is a mixed solvent of water and at least one solvent selected from the group consisting of mono and dialkyl ethers of ethylene glycol.

125. (Previously Presented) The organic EL element of claim 124, wherein the at least one solvent selected from the group is ethoxy ethanol.

126. (Previously Presented) The organic EL element of claim 113, wherein the lubricant is glycerin.

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127. (Previously Presented) The organic EL element of claim 113, wherein a film thickness of the hole injecting or transporting layer is $0.1\mu\text{m}$.

128. (Previously Presented) The organic EL element of claim 113, wherein a film resistance of the hole injecting and transporting layer is in the range $0.5 \times 10^9 \Omega/\text{m}^2$ to $5 \times 10^9 \Omega/\text{m}^2$.